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ABSTRACT

To contribute intelligently to the scholarly debate in their field, students must realize that variations in vocabulary, stylistic conventions and methods of argumentation among different disciplines' literature reveal distinct assumptions about and methods for working within the world. The broad agreement between author and audience on the criteria for evaluating a problem in molecular biology, for example, leads to an emphasis on concrete, precise presentation of evidence. Lacking a common framework for evaluating past and present literature, sociology articles, however, must first persuade readers to accept their method of analyzing problems before presenting evidence. More than understanding the game in which they are operating, students need to see how the rules of the game have changed over time. They need to develop a historical perspective. The shift in perceived tasks in physics articles during this century, for example--from simply presenting data clearly, to arranging data to support a model, to reconciling conflicts between the data and the model--suggests that students need to understand the developing relationship between thought and language so they can reshape language as their own and their discipline's thinking changes. (MM)

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Discourse Paths of Different Disciplines

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About five years ago I was tempted by two complementary thoughts: First, composition students learned to write in order to participate in the academy and to carry the wisdom of the academy into other endeavors. Their writing was intimately bound up with the knowledge produced by the disciplines of the academy. Second, academic knowledge most frequently took on the form of texts. Thus tempted, I ventured on a sightseeing tour of written knowledge.

The first thing I found, not surprisingly, was that articles in different disciplines were different. The differences, however, went far deeper than differences of vocabulary, conventions, or acceptable arguments; the differences extended to the very tasks the articles were trying to perform and the worlds in which those tasks were being performed. The depth of difference called into question the concept of non-fiction, which covers all academic documents as well as many other kinds of documents from other domains. The term non-fiction is, to start with, suspect, for it is only a negative--that which is not fiction, fiction being

understood as that which interests us as literary scholars, critics, and humane readers. We have many theories and taxonomies of fiction. Non-fiction is the other stuff, uninteresting and unproblematic unless it bears similarity to fiction, as in the literary essay. We have few theories or taxonomies of non-fiction. Recent structuralist theorists who have taken some interest in non-fiction have done so because they treat reference to reality as a kind of fiction, reducing all texts to varieties of fiction. Any positive notion we have of non-fiction is based on the idea of reference, but insofar as we treat that reference as unproblematic we disqualify the text as being treated as an interesting product of written language. What the reference consists of, how it is accomplished, what are its varieties and range, and what kind of argument and representation it creates have not been investigated.

As a first mapping expedition ("What Written Knowledge Does: Three Examples of Academic Discourse," Philosophy of the Social Sciences 11:3 (1981), 361-387), I looked at three texts, one each from molecular biology, sociology and literary studies. I still do not know the geography of the fields well enough to say how typical the texts are, but they do provide glimpses of the terrain. Each of the texts was set against

a different terrain and then held to different referential responsibilities. I located each text with respect to four dimensions: the text's relation to the phenomenon which is the ostensible topic ("reality"), to the audience, to the prior literature of the field, and to the author's identity.

In molecular biology Watson and Crick's famous article presenting a structure for DNA ("A Structure for Deoxyribose Nucleic Acid," Nature 171 (1953), 737-738) maintains focus on the phenomenon being discussed by harnessing other relationships to that primary one through a variety of techniques which depend on the structure of the discipline. Author and audience, for example, share criteria of judgment about a new claim, based on the fit between the consequences of that claim and measurable features of observed nature. Thus the author's persona is limited to claim-maker and presenter; the individual's professional fate rises and falls on how well the claim is judged to fit the corporate observations of the discipline. Similarly, persuasion rests on evidence of fit between observed nature and claim; prior and competing literature are judged by the same criterion. Watson and Crick can, therefore, dismiss competing claims because one does not correspond to other well-established features of molecules and because the other is too "ill-defined"

to allow calculations of the sort which would permit judgment. Finally, such subordination of the literature to the fit between claim and observed nature allows the crisp ordering of prior literature, so that both author and audience share broad ranges of understanding, concrete knowledge, definition of problems, and language, as laid out in the consensually agreed upon canon of literature.

The sociologist Robert K. Merton, in "The Ambivalence of Scientists" (in Norman Storer, ed., The Sociology of Science (Chicago: University of Chicago Press, 1973), 383-412), must address a situation where much less is shared. He must establish the ground on which the claim is to rest. The phenomenon studied is not universally recognized as a discrete phenomenon, nor does much of the needed language have univocal, ostensive reference. The literature of the field is unsettled and does not provide a common framework in which to place the new claim, nor are the criteria the audience will apply clear-cut or universal. It is not even certain what intellectual framework the audience will bring to bear on the text. The author must then start out from an individual perspective, but through the medium of the paper must draw the readers into his perspective. Yet the purpose remains to say something about the world, rather than simply establish a distinctive perspective, create community with the audience,

or reinterpret and reconstruct the literature. He must, however, attend to these latter tasks to accomplish the first.

In the article of literary criticism, Geoffrey Hartman's "Blessing the Torrent: On Wordsworth's Later Style" (PMLA 93 (1978), 196-204), the essential reference is phenomenological--an experience to be transmitted from poet to reader via the intermediary of the critic-author, who through his special sensibility gives the audience access. The poem (the apparent topic of the essay) is at one level thoroughly unproblematic; the text is given and its meaning is routinely explicable and, therefore, uninteresting to the critic. However, Hartman finds in the poem an experience that unfixes the meaning, thereby revivifying the poem. The prior critical and poetic literature are treated idiosyncratically to provide access to the aesthetic moment which is Hartman's concern. Prior statements are treated not as a body of coherent knowledge, but as a welter of aesthetic moments to be reshaped in service of a new moment identified by the critic. To draw the reader into the aesthetic moment, the critic must persuade us as much of the quality of his sensibility as of the substance of Wordsworth's poem, for the critic's is the mediating vision.

Each of the three articles is making different moves in different games. Thus the second moral of my journey is that students need to be able to determine what kind of game they are writing in, judge what kind of move they wish to make, and have access to those rhetorical tools that would help them realize those moves. A third moral is that the literature of a field embodies the state of the discussion, so that students need to be able to evaluate a literature and place their own work against that context.

The next two excursions further suggest how a disciplinary style embody the historical accomplishment of the discipline. The scientific article was a literary invention simultaneous with the invention of the scientific journal, following on the heels of the invention of the newspaper. The first volume of the Philoscphical Transactions of the Royal Society is written in a voice we now associate with the New Yorker's "Talk of the Town" column, without the bemusement, but with the informality of the first person interlocutor, the chattiness about the latest curiousities, and the underlying socially uplifting attitudes. As science and its institutions began to take shape, the scientific article changed to become a useful tool in the changed conditions. The scientific article became, indeed, a primary mechanism by which emerging disciplines constituted themselves intellectually and socially.

The history of the scientific article has yet to be written, but I have looked at the changing characteristics of articles in Physical Review, founded in 1893 as a regional university organ of the backward American physics community but now the main journal of international physics. To simplify my study ("The Evolution of Modern Experimental Report: Spectroscopic Articles in Physical Review, 1893-1980") I focussed on articles in experimental spectroscopy.

In the early years of Physical Review, as American physics professionalized, articles became less simply descriptive and struggled with how to harness detail to a central abstract thought. References to prior literature became less historical narratives and more problem related. Writing became more compact, shorter, and less digressive. The introduction of quantum theory made theoretical issues both the topics and organizational principle of articles. As knowledge increased, so did technical vocabulary as well as references, which were increasingly integrated throughout the entire argument. Further, sections devoted to theory, review of the literature, discussion, and conclusions grew. Each new piece of work was bound up witha growing web of knowledge. Most strikingly, however, the mode of argumentation changed with changes in the epistemology of the field.

That is, physicists' beliefs about what they could know, how they could know it, and how they could express it affected the kinds of arguments they proposed. As long as physicists believed in a coherent, substantive nature which directly corresponded to available vocabulary and measures, they needed only to present the method of measurement and pages of data tables. Later, with a belief in generalized laws of nature that would account for measurements, the writing task became to obtain the right formulation and to show the correlation between data and generalization. Most recently, however, with self-consciousness about the artifice of theory, physicists argue tentatively for conjectural models presented after the data, to account for peculiar features of that data. The concept of relative quality of fit between model and data becomes increasingly important.

Moral four, then, is that we need to give students enough of an understanding of the relationship between thought and language so that they can develop flexibility to reshape their language as their and their discipline's thinking changes. If they develop only an habitual style, students trained today will be writing 1983-style history or physics up to the middle of the twenty-first century.

The second historical excursion ("Getting the Damn Parts to Fit Together: Strategies in Writin a Science of Politics") is through the recent history of writing in political science, which in the past thirty years has attempted adopted a new discourse style thought to be scientific, but bearing in fact more resemblence to the high school laboratory report, where well-established knowledge is exercised within a strongly heirarchical social system. Articles from the 1979 American Political Science Review reveal great strain in trying to harness recalcitrant subject matter to this simplified form, while still dealing with an ambiguous, uncertain literature and a varied audience. Authors inevitably find themselves in explanatory, justificatory, reconciliatory, and persuasive tasks that go beyond their stereotype of scientific language. Problems arise in nomenclature, discussion of the literature, problem definition, significance, interpretation of data, authorial role, and relation to the audience. Some authors seem more conscious of the problems and better able to improvise solutions, but all are caught in the strain. This does not necessarily mean that a new style is not needed and appropriate, but only that more rhetorical thought and struggle are called for.

Moral five, then, concerns making neophyte writers of knowledge aware that writing is a problem solving activity

of the deepest order. Understanding the problem of formulation is tied to understanding the basic issues of a discipline.

The final excursion is into the process by which one text got to be the way it is through constraints, choices, and inventions ("The Writing of Non-Fiction: Contexts, Choices, and Constraints in a Scientific Paper"). The process that leads to certain words appearing in a text is a key to understanding the non-fictionality of that text. We distinguish a scientific article from an elaborate fiction with the vocabulary and format of a scientific article by, at least in part, by the assumption that the author of the scientific article has produced claims through a series of focussed, motivated interactions with observed nature while the story writer at some point has cut the tether to nature. Thus in inquiring into authors' accountabilities, we must look at those junctures at which these accountabilities are brought into play and the means by which they are enforced.

The historical context, notebooks and rough draft leading up to a 1925 paper by the physicist Arthur H. Compton reveal the published paper was driven by persuasive intentions growing out of a theoretical program. Compton was answering objections to his previous major paper demonstrating what has since become known as the Compton effect. But the paper was also constrained and shaped by other findings reported in the

literature and by the author's active and normative search for closer knowledge of the phenomenon under investigation. These motives and constraints directed Compton's prewriting strategy. In order to answer objections he expanded theory and adopted new experimental methods. Further, he designed his experiment to generate comparisons of theory and data that allowed closer description of the phenomenon. That is, social, historical, and intellectual pressures--given the mode and criteria of argumentation of his discipline--drove Compton to raise higher order questions of correspondence between description and observation. These early strategic choices represent the essential rhetorical decisions of the final paper.

In carrying out these early strategic commitments, Compton becomes constrained by what mathematical operations he can legitimately perform on theory, by what he can actually make the apparatus do, and by what turns up on the photographic plates. Although he has a small degree of rhetorical control over precision at this stage, the only major rhetorical decision he can make at this point is to publish or withhold publication. Once he gets to the final writing-up stage, some of the power returns to his hands, but here we find his behavior, as reflected in the draft and revisions, less driven by partisanship than by the normative desire to

create an adequately complete and precise account of theory and experiment. He retains personal responsibility for work, theory, and data, but attempts to establish validity as a matter of consensual judgment based on the irrefutability of nature. This is more than an arbitrarily chosen stance, for it reflects the process that has created the document.

As the document takes shape through drafting, revision, subtitling, and abstracting, the document becomes a self-conscious artifact, separate from the nature it describes, but actively held accountable to nature. This active accountability may have its roots in the anticipation of audience criteria of judgment.

The sixth moral, then, requires that we give students understanding and control over the process that produces their writing, not only because such control may make them more efficient and effective writers, but because the process is integrally related to the kind of document that will result. How people go about writing bears on the kind of fiction or non-fiction they produce.

The last moral does not concern students and is not a moral. It is an opportunity for literary scholars with an interest in writing. Non-literary texts offer a richly

contoured territory for investigation--so richly contoured, however, that quick generalizations drawn from literary theory cover the ground only in the sense of hiding it. Our literary trainings have given us a love of the particular. Any fruitful generalizations we are to derive in this area must be rooted in that same love and detailed analysis of the use of language in context. But the grounded generalizations we do discover promise to tell us of the real workings and power of written language. The game is worth the candle.